

SAFE WATERS: BUILT BY YOU

High School; 9th-12th Grade
Discussion Guide

UNIT THEME
Water Safety

TIMEFRAME
Four 45 minute sessions

MATERIALS
Access to computers, internet and a device with access to an APP store

VIDEOS
Video Reflection Worksheet: <https://vimeo.com/1067127982>
APP/Game Planning Document: <https://vimeo.com/1073276893>

KEY WORDS
Buoyancy, Archimedes Principle, inferred, PFDs (Personal Flotation Device), VHF Radio, emergency beacon, expanding square search/parallel track search, drone, GPS

LEARNING OBJECTIVES

Students will be able to:

- Interpret boating safety data to design an educational smartphone app or game that promotes safe practices for recreational boaters.
- Reflect on how preparation, personal responsibility, and innovative technology can prevent boating accidents and save lives.

PROCESS OBJECTIVES

- Collaborate in teams to develop and present a product pitch using research, visual design, and persuasive communication strategies.



ENDURING UNDERSTANDING

Students will understand that safe boating isn't just about knowing how to operate a vessel, it's about making informed, proactive choices before ever hitting the water. By understanding real-world risks and leveraging tools like data, technology, and planning, individuals can prevent accidents and protect people.

ACTIVITY SUMMARY

In this lesson, students will dive into real-life Coast Guard rescue missions to explore the critical role of preparation in boating safety. Framed by the essential question: *The Coast Guard is always ready, but what can you do to make sure you don't become the next rescue case?*; students will examine dramatic case files, identify common boating hazards, and learn how weather, gear, and human responsibility factor into both human and marine rescues. Working in collaborative teams, half the class will become Sage Boating App Developers and the other half Game Designers. Using real Coast Guard accident data, they will design innovative smartphone apps or games that promote safe boating practices. Each group will research existing technologies, outline key features, and pitch their product to a target audience of recreational boaters. Through this engaging, peer-driven project, students will come to understand that safety isn't accidental, it's about preparation, awareness, and action.



VOCABULARY

BUOYANCY - The force that allows things to float in water or other fluids. It pushes up on objects, helping them stay above the surface instead of sinking.

ARCHIMEDE'S PRINCIPLE - A science rule that says when something is placed in water, it pushes some of the water out of the way. The water pushes back with a force equal to the weight of the water that was moved —this is what makes things float.

INFRARED - A type of light we can't see with our eyes, but we can feel as heat. Special cameras use infrared to detect heat, which helps rescuers find people or animals in the dark, in water, or through smoke.

PFDs (PERSONAL FLOTATION DEVICE) - A safety device designed to help a person stay afloat in the water, preventing drowning. PFDs are available in various types, including life jackets, vests, and throwable devices, each designed for specific activities and water conditions.

VHF RADIO - A special radio that works over short distances using Very High Frequency signals. Boaters and rescuers use it to talk to each other on the water, especially in emergencies.

EMERGENCY BEACON - A small device that sends a signal with your location to rescuers if you're lost or in danger. It helps search teams find you quickly, even if you can't call for help.

EXPANDING SQUARE SEARCH /PARALLEL TRACK SEARCH - Two patterns used by the Coast Guard to look for people or boats in trouble:

- Expanding Square Search: Starts in one spot and spirals outward in bigger squares
- Parallel Track Search: Moves in straight, side-by-side lines across an area

DRONE - A flying robot controlled from the ground, often with a camera. Used by rescuers to see large areas quickly and safely from the air.

GPS (GLOBAL POSITIONING SYSTEM) - A system that uses satellites to show your exact location on Earth. It helps boaters, drivers, and rescuers find where they are or where they need to go.

OVERVIEW

Many people enjoy spending time on the water—fishing, participating in water sports, or simply relaxing and enjoying the scenery. For others, waterways are part of their daily work. In either case, being prepared for potential dangers is essential. One component of preparedness is ensuring you have all of the right safety equipment just in case. Helpful items include a VHF radio (which works without cell service), a flashlight, fire extinguisher, navigation lights, a bucket or bilge pump, and an emergency kit with first aid supplies, whistles, and other distress signals. Additionally, all watercraft should have a cutoff switch which will stop the engine should the driver fall overboard. Before getting on the water, make sure you also developed a plan to get off the water in case something goes wrong.

Once you've checked the weather to make sure it is safe and clear and ensured that everyone has basic first aid training. Once on the water, safe navigation is critical—watch for shallow areas, obstacles, and no-wake zones. Finally, everyone must wear a properly fitted, Coast Guard-approved personal flotation device (PFD).

LEARNING PROCEDURE

SESSION 1:

To begin the lesson, invite students to imagine they are planning a weekend boating trip with friends. Ask: What do you think needs to happen before you get on the water to make sure everyone stays safe? Jot down student ideas on the board to surface their prior knowledge about boating safety.

Next, introduce the critical question of the unit: *The Coast Guard is always ready, but what can you do to make sure you don't become the next rescue case?* Guide students in a brief discussion exploring what this question means. Why might some boaters find themselves in risky situations? What decisions or habits increase the chances of needing a rescue?

After completing the introductory lesson, provide the students with the video reflection document: *Coast Guard Rescues & Boating Safety: Real-Life Case Files! Video Response Questions*. Instruct students to preview the questions noting that the questions may not all directly follow the order of the video. After viewing the video and providing students with some time to discuss the answers to the questions as a class. It may be helpful to have students do a pair-share with one partner before opening the discussion to whole group. Encourage discussion and invite equity of student voice.





Educational Partners:



Produced under a grant from the Sport Fish Restoration and Boating Trust Fund, administered by the U.S. Coast Guard.

COAST GUARD RESCUES & BOATING SAFETY: REAL-LIFE CASE FILES!

VIDEO RESPONSE QUESTIONS

Student Name:

Class:

Date:

Before watching the video(s) or exploring the website, review these questions and look for answers during the video(s).

WRITE OR SKETCH

1) What's one piece of gear the Coast Guard or boaters use that surprised you?

2) Sketch or list two items every safe boat should have on board:

3) What was one example of weather creating a danger on the water?

THINK AND RESPOND (WRITTEN):

4) What role does the Coast Guard play in emergencies? Be specific.

5) Why is checking the weather before boating so important?

6) How do aquariums and scientists help in rescue situations?

REFLECT (WRITTEN):

7) If you had to explain the most important part of boating safety in one sentence, what would you say?

8) What is one thing you would teach a new boater after watching the video?



SESSION 2 AND 3 - TEAM RESEARCH AND PLAN DEVELOPMENT:

For this activity, divide the class into four groups. Two groups (half the class) will be responsible for developing a smart phone app for safe-boating and the other two groups will be responsible for a smart phone game for safe-boating. To help ground the students with the task at hand, play the curriculum video provided. Below you will find additional guidance for each set of students. Additionally, provide each group with a copy of the App/Game Planning Document. Once students are familiar with the presented task, groups, have students perform online research from the links provided, plus other sources they discover, then discuss and develop their group's specific plan. Students should be given the remainder of session 2 and all of session 3 to engage in research and plan development. Student projects should be supported by factual research and/or evidence. Remind students they will be presenting their projects during session 4.

APP Developers:

Research real boating accident data from the U.S. Coast Guard and other sources to find out the most common causes of accidents. Use this information to decide what safety features your app should include.

Explore existing safety or boating apps in the App Store to gather ideas and features you might want to include in your own app, which you can name something creative.

Split into two groups:

- One group will design a smartphone app that helps both beginner and experienced boaters stay safe on the water.
- The other group will create a business and marketing plan to explain how you would fund and promote the app.

Create a poster or flow chart that shows how your game works and how you'll launch it to your target audience—recreational boaters of all types.

Game Developers:

Research real boating accident data from the U.S. Coast Guard and other sources to identify the most common and dangerous causes of accidents. Use this data to decide what safety lessons your game should include.

Explore existing safety or boating games in the App Store or free game websites to gather ideas for fun and engaging features. Give your game a creative title.

Split into two groups:

- One group will design a smartphone game that helps both new and experienced boaters learn how to stay safe on the water.
- The other group will develop a business and marketing plan to explain how you would fund, promote, and distribute the game.

TEAM PLANNING DOCUMENT

Student teams should use this planning worksheet as a collaborative guide to organize their research, brainstorm innovative ideas, and plan their final product and presentation. Teams will begin by investigating real boating accident data and analyzing existing safety apps to identify the most important features for their own app or game. Based on their assigned roles, either app design or business/marketing, work together to develop safety solutions for recreational boaters and outline how to reach their target audience. As you complete each section of the worksheet, teams will make key decisions, record their creative thinking, and prepare materials for a visual poster or flow chart.

Concept and Team Roles

App/Game Design Team Members:

Business/Marketing Team Members:

App/Game Title:

Core Idea and Target Audience

- One-Sentence Concept:
- Target User:

Research and Analysis

Boating Accident Data:

- List the sources of your data:
- Top 3 causes of accidents (with percentages or graphs available)
 - 1
 - 2
 - 3
- What dangers or effects should your app/game address?
 - 1
 - 2
 - 3



APP/Game Inspiration

List at least two existing safety/boating apps/games and their key features:

- | | |
|-----------------|---------------|
| • APP/Game name | Key Features: |
| • APP/Game name | Key Features: |

What features are creative or helpful?

What features could you improve on or make more user-friendly?

Features Development and Planning

List at least three features you would like to include in your App/Game and why they important to include:

How will the user actually interact with the key features?

**Examples of features (weather alerts, checklist tools, gps map, etc.)*



Business and Marketing Strategy

What will your funding plan be?

How will you promote your new APP/Game?

Why will your audience respond to this approach?

PRESENTATION POSTER OR FLOW CHART

What will your title or tagline be?

What are the top App/Game features you want to share and explain?

What will the flow of the presentation be and who will be responsible to present each segment?

What will the marketing steps be?

What will the appeal be? What will it look like visually and why will your audience want to use/play it?



SESSION 4 - PRESENTATION:

Each of the four groups will present their plan to the class and explain how their app or game will work to save lives. Offer additional time and space for a Q&A session.

Conclude the lesson by returning to the critical question, *The Coast Guard is always ready, but what can you do to make sure you don't become the next rescue case?* and asking students what one new action they will take the next time they take to the water.

Assessment:

Students will be informally assessed based on their participation within their groups as well as during whole group discussion following the video.

Students can be formally assessed via the video reflection document. Additionally, students may engage in self assessment of how they participated individually and as a team. Teachers wanting a more formal assessment of group presentations may consider developing a rubric. You may also pose the following reflection questions based on the team project:

What was the most helpful data in shaping your app/game?

Which feature do you think makes the biggest safety impact?

One thing you'd add or change if you had more time?

EXTENDING THE LESSON:

(Options for extended/additional activities and lessons)

Safety Gear Show-and-Tell

Invite a local Coast Guard member, first responder, or boating expert to demonstrate actual safety gear (like PFDs, emergency beacons, and flares). Students can handle the gear, ask questions, and reflect on how their app or game can realistically feature or promote these tools.

PSA Video Challenge

Students script and produce short public service announcements promoting safe boating practices. These videos can be shared on school platforms or submitted to real-world boating safety campaigns.

Marine Wildlife Rescue Mini-Unit

Students research the intersection between boating activity and marine animal endangerment. They design an awareness campaign or game feature that helps boaters recognize and respond to wildlife encounters safely and ethically.

RELATED LINKS

- **The National Boating Safety Advisory Council (NBSAC):** The Council has consistently provided invaluable advice to the Coast Guard on a broad range of boating safety matters. <https://www.uscgboating.org/NBSAC/index.php>
- **U.S. Coast Guard Statistic Site:** Detailed statistics on all reported recreational boating safety accidents and incidents throughout the United States and its territories. <https://www.uscgboating.org/statistics/index.php>
- **The Strategic Plan of the National Recreational Boating Safety Program:** Describes the U.S. Coast Guard's goals and strategies to ensure the public has a safe, secure, and enjoyable recreational boating experience by implementing programs that minimize the loss of life, personal injury, and property damage while cooperating with environmental and national security efforts. <https://www.uscgboating.org/content/strategic-plan.php>



The following National Common Core Standards can be met teaching:

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9TH-10 GRADE:

CCSS.ELA-LITERACY.RI.8.1	Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
CCSS.ELA-LITERACY.RI.9-10.1	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
CCSS.ELA-LITERACY.RI.9-10.2	Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.
CCSS.ELA-LITERACY.RI.9-10.6	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).
CCSS.ELA-LITERACY.RI.9-10.7	Analyze various accounts of a subject told in different mediums (e.g., a person's life story in both print and multimedia), determining which details are emphasized in each account.
CCSS.ELA-LITERACY.W.9-10.2	Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
CCSS.ELA-LITERACY.W.9-10.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1-3 above.)
CCSS.ELA-LITERACY.W.9-10.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
CCSS.ELA-LITERACY.W.9-10.8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
CCSS.ELA-LITERACY.W.9-10.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
CCSS.ELA-LITERACY.W.9-10.10	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.
CCSS.ELA-LITERACY.SL.9-10.1	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
CCSS.ELA-LITERACY.SL.9-10.2	Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.
CCSS.ELA-LITERACY.SL.9-10.3	Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.
CCSS.ELA-LITERACY.SL.9-10.4	Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.



- CCSS.ELA-LITERACY.SL.9-10.5** Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
- CCSS.ELA-LITERACY.SL.9-10.6** Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9-10 Language standards 1 and 3 here for specific expectations.)
- CCSS.ELA-LITERACY.L.9-10.3** Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.
- CCSS.ELA-LITERACY.L.9-10.4** Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 9-10 reading and content, choosing flexibly from a range of strategies.
- CCSS.ELA-LITERACY.L.9-10.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

11TH-12TH GRADE:

- CCSS.ELA-LITERACY.RI.11-12.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.
- CCSS.ELA-LITERACY.RI.11-12.2** Determine two or more central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to provide a complex analysis; provide an objective summary of the text.
- CCSS.ELA-LITERACY.RI.11-12.4** Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text (e.g., how Madison defines faction in Federalist No. 10).
- CCSS.ELA-LITERACY.RI.11-12.7** Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.
- CCSS.ELA-LITERACY.RI.11-12.10** By the end of grade 11, read and comprehend literary nonfiction in the grades 11-CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literary nonfiction at the high end of the grades 11-CCR text complexity band independently and proficiently.
- CCSS.ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
- CCSS.ELA-LITERACY.W.11-12.4** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1-3 above.)
- CCSS.ELA-LITERACY.W.11-12.5** Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1-3 up to and including grades 11-12 here.)
- CCSS.ELA-LITERACY.W.11-12.7** Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.



CCSS.ELA-LITERACY.W.11-12.8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
CCSS.ELA-LITERACY.W.11-12.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
CCSS.ELA-LITERACY.W.11-12.10	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.
CCSS.ELA-LITERACY.SL.11-12.1	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11-12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
CCSS.ELA-LITERACY.SL.11-12.2	Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.
CCSS.ELA-LITERACY.SL.11-12.3	Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used.
CCSS.ELA-LITERACY.SL.11-12.4	Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.
CCSS.ELA-LITERACY.SL.11-12.5	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
CCSS.ELA-LITERACY.SL.11-12.6	Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate. (See grades 11-12 Language standards 1 and 3 here for specific expectations.)
CCSS.ELA-LITERACY.L.11-12.3	Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.
CCSS.ELA-LITERACY.L.11-12.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11-12 reading and content, choosing flexibly from a range of strategies.
CCSS.ELA-LITERACY.L.11-12.6	Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

NEXT GENERATION SCIENCE STANDARDS:

HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity
HS-ESS3-4.	Evaluate or refine a technological solution that reduces impacts of human activities on natural systems
HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.